



A Review Paper on Electric Loader

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ABSTRACT

This research paper aims to undertake a comprehensive study of the battery-operated electric loader in the state of Delhi. It studies the socio-economic impact and the technical characteristics to make a case for regularization of electric loader in the state. The paper also attempts to make policy recommendations to make these vehicles safer and more efficient. The number of battery operated electric loader in Delhi has risen from 4,000 in 2010 to more than 1,00,000 in 2014, and is now an integral part of the transport eco-system in the state. With a proper regulatory framework in place, this mode of transport can contribute to the revenue generation of the government, urban planning and help improve the transport structure of the state. The Socio-Economic impact of the functioning of the battery loader has been studied by collecting primary data from the shareholders within the battery loader industry, in order to understand the role of the industry in urban employment and income generation, and the various problems that affect the system. It also tries to propose a structure which would be cohesive in nature, and support the public transport system. The technical parameters have been studied to suggest effective manufacturing policy recommendations for the state of Delhi. Safety is an important issue for the governing authorities, as a study found that 80% of the passengers felt unsafe while traveling by these loader. The paper also analyses the Tripura Battery Operated loader Rules, 2014 to analyze which aspects of the rules can be incorporated to help in the formulation of the rules in the state of Delhi. The mode of transport has some clear merits and some demerits to it, and the paper has tried to deconstruct these aspects.

Keyword – Battery, Loader, Socio-economic, technical, transport.

1 Introduction:

The word electric loader's origins lie in the Japanese language, and it literally translates to "a human powered vehicle". The electric loader is one of the oldest modes of transport, and was first introduced in the late 19th century. It is used all across the world, but more common in the Asian countries, especially in India and Bangladesh. The various types of electric loader have also evolved over time with the earliest ones being the pulled- electric loader. Other variations of the mode of transport include the cycle- electric loader, the auto-electric loader and the relatively newer iteration of the e -rickshaws. . Historically, India's urban as well as rural areas have depended on the various electric loader types for their travel requirements. The state of Delhi has close to 1,00,000 Auto-rickshaws, and an estimated 7,00,000 cycle electric loader, of which a large percentage is unlicensed.



The most recent modification called the battery operated electric loader (Referred as battery electric loader subsequently in the study) was introduced in the city of New Delhi during the Commonwealth Games 2010, with the plan to eventually phase out the physically taxing cycle electric loader in the city. Even though no government figures are available, rough estimates put the number of electric loader in the city close to the figure of 1,00,000. The electric loader in Delhi are presently unregulated and are not registered with the government.

2 Major Components and Parts

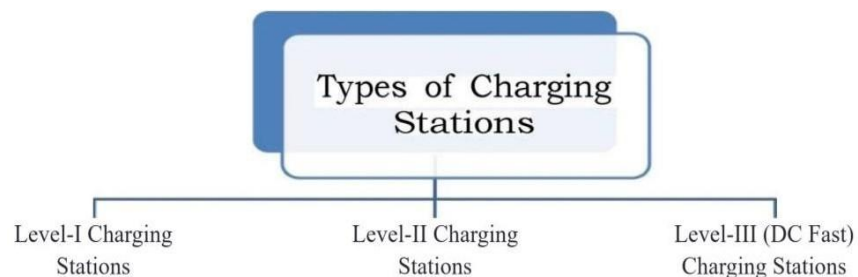
- Electric Motor: BLDC type 650-1400W & 48V motor. It is controlled via an electronic controller.
- Electronic Motor Controller: The controller includes a manual or automatic switch turning the motor on/off, selecting forward or reverse motion, selecting and regulating speed.
- Battery: Set of four 12V deep cycle lead acid/Li-ion batteries.
- Brakes: Drum brakes, actuated internally, expanding shoe type
- Steering: Handle bar type steering.
- Front Suspension: Helical Spring with dampener with hydraulic telescopic shock absorbers.
- Rear Suspension: Leaf spring carriage spring with rear shocker.

3 Methodology Or Process:

- The working of Electric loader is based on DC motor, battery & suspension system.
- It uses a Brushless DC motor ranging from 650-1400 Watts with a differential mechanism at rear wheels.
- It consists of the controller unit.
- The battery used is mostly Lead acid or Li-ion battery.

4 Charging Stations

An electric vehicle charging station is an element in an infrastructure that supplies electric energy for the recharging of electric vehicles.



1 Level-I Charging Stations

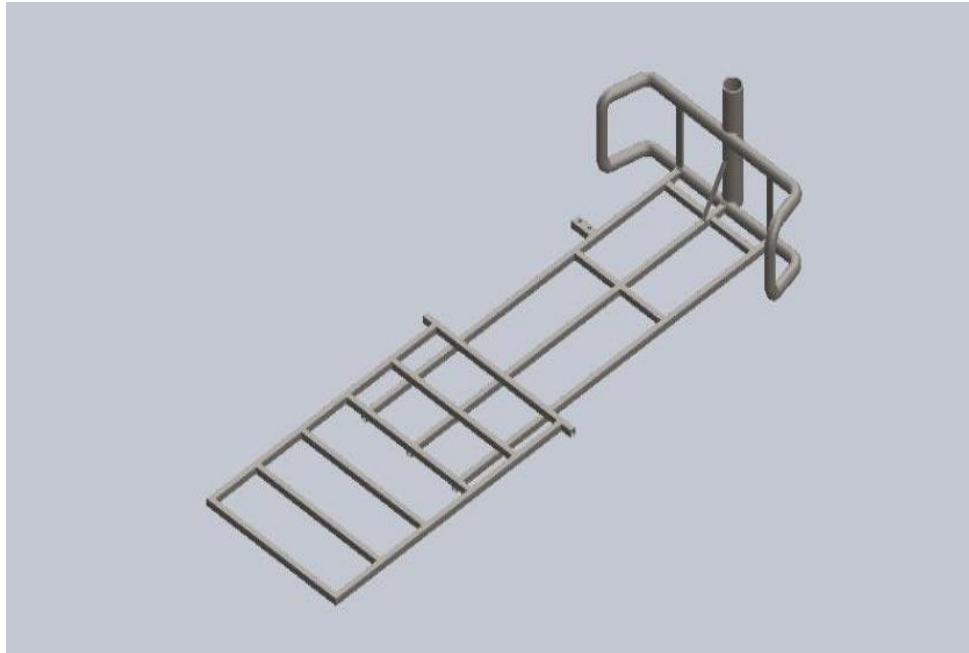
- It comes under slow charging.
- *It takes about 8-10 hours to completely charge the vehicle.
- These are mostly used at home as it perfectly suits overnight charging.
- With this type of charging, the life of batteries is high.

Level-II Charging Stations

- It comes under medium charging category.
- It takes 3-4 hours to completely charge the vehicles.
- With this type of charging, the life of batteries is comparatively high but not as that of level-I charging.

Level-III Charging Stations

- This is the fastest type of charging.
- The charging units are very expensive and require more power.
- To charge 80% of the battery, it takes around 30 to 45 minutes.
- Life of battery is widely affected by the speed of charging.

5 Chassis Design of Electric Loader:**6 Advantages:**

1. Eco – friendly – E-rickshaws can be the best alternative to petrol or diesel run vehicles as they are operated on battery. These rickshaws do not emit smoke and thus, will not contribute to the increasing air pollution. The batteries which will be used for the functioning of these rickshaws can be effectively recycled.
2. Economical – E-rickshaws are comparatively cheap and can be easily afforded by a common man. Passengers will have to pay a less transport charge. It is cost effective not only for the consumers but also for the owners. The batteries can be easily recharged from home or from any place that provides a proper voltage.
3. Free from noise pollution – E-rickshaws are free from creating noise pollution as they do not emit any sound. Passengers can have a smooth and comfortable ride.
4. Livelihood – E-rickshaws provide a means of livelihood for the common as well as illiterate people, the e-rickshaw drivers can earn a good livelihood.
5. Safety – E-rickshaws involve less risk when compared to the other fuel operating vehicles. They can cause less accident as they are slower and lighter than an auto rickshaw. There is a chance of explosion in the case of fuel operating vehicles.
6. Easy maintenance – As they use electricity, they do not require fuel to operate the engines. E-rickshaws are free from an engine and a gear box and thus, the burden of maintenance is reduced. The motor which is used in these rickshaws is smaller and the battery is placed below it. Hence, maintaining them is quite easier.

7 Disadvantages:

1. Less speed – E-rickshaws are usually slow in speed and it runs around 30-35 kmph and thus, it is unable to meet the speed of other vehicles.
2. Less weight – E-rickshaws are lighter in weight and thus, it would face difficulty to cope up with the larger wight vehicles. There might be a chance of the rickshaw getting upside down. In India, one can imagine how the drivers would ride an overloadede-rickshaw.

8 Conclusion:

In this paper we have done review electric loader this paper recommends the formation of strong policies which ensure a safe design of the loader and efficient functioning within the city. The analysis of the Tripura Battery Operated Rules, 2014 provided some pertinent recommendations for the formulation of policies in the state of Delhi. Based on the Tripura rules, the paper recommends specified parking spots for these vehicles and zoning of the loader. The findings of the socio - economic study suggest the need for financing and credit/asset lending options for the drivers, and insurance policies for the battery loader. The extended recommendations propose a future course of action of creating an infrastructure for the electric vehicles with the help of the Delhi Metro and extending the operation of the loader to support the presently inadequate Metro Feeder System.

REFERENCE

1. <http://www.varleygroup.com/site/electric-vehicles>.
2. <http://www.seminaronly.com/>
3. <https://www.wikipedia.com/showroom/electric-tow-vehicles.html>
4. <http://www.plugincars.com/guide-electric-vehicles-and-the-smart-grid.html>
5. <http://www.emoss.nl/en/electric-vehicles/full-electric-truck/>
6. <http://www.varleygroup.com/site/electric-vehicles>
7. <https://www.alibaba.com/showroom/electric-tow-vehicles.html>
8. in.zapmetasearch.com/The Electric Car
9. <https://www.searchencrypt.com/search?eq=HYZbRh5HSZ2n7yiNNO0b63ga4xoxfD7ICBUqI8ehFik%>
10. <http://www.varleygroup.com/site/electric-vehicles>